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BOOK REVIEW

An Outline of Psychobiology. By KNIGHT DUNLAP. Baltimore, Johns Hopkins Press, 1914, pp. 121.

Dunlap's intention as expressed in his preface was the production of a book for students of psychology (primarily his own) who have had no courses in biology, to convey to them in the limited time at their disposal the elementary information which is absolutely necessary and to stimulate them to further reading.

Dunlap expresses the conviction that psychologists have overestimated the neurological side of biology and have neglected the functional relations of muscle and gland to the nervous system, which he classes as essential requirements for the application of the facts of neurology to psychology.

Considering the object and viewpoint expressed in the preface it comes as a distinct surprise to find that the structural treatment is the dominant one throughout the book and that it is replete with technical terms and with little explanation of a sort which would make it available to those who have had no biology. Another rather striking feature of the treatment is a sort of dogmatism, which makes no mention of the alternative in debated questions, or dismisses them without discussion.

The first chapter deals with the cell and its division from a morphological standpoint, with only two short paragraphs devoted to its chemical and biological aspects.

Chapter two covers in less than six pages (over half of which are illustrations) the whole subject of embryology and the histology of all tissues, except the nervous, muscular and glandular. As might be expected from the space occupied the treatment is too brief to be consistent, either with clarity or adequate consideration. For instance heading No. 6 tells us that the vascular tissue "includes the blood and lymph, the lymph glands and the red marrow of the bones." Apparently the blood and lymph are left to find their way about the body without guiding vessels. The only further discussion of this group is contained in the dependent clause "and develops from the endoderm," thus making the only remark on this great group of structures a positive statement concerning a much debated question.

In the chapter on muscle appears the first proportionate attempt at a functional treatment of the subject. The discussion of the contraction of smooth muscle states that this tissue "cut off from all nervous connection . . . may still contract and relax alternately if subjected to a continuous external stimulus" and overlooks the pregnant fact that the plexuses of Auerbach and Meissner form an intrinsic nervous mechanism which is not ablated in the type of experiment from which these conclusions are drawn.

The chemical treatment of muscular metabolism is too brief to do justice to such a subject. The discussion of fatigue leads us by inference to the conclusion that it is essentially a muscular process. No mention of neuronc fatigue is made. Under the heading "elec-

trical properties of muscle," a brief description is given of the demarcation current and action current and the subject is then discussed in a paragraph which states that they may not be of any special significance and in any case are probably artifactual with no mention of the more recent work on the electrochemical hypothesis of cell excitation and its bearing on the neuromuscular apparatus. The further statement in this last paragraph that there is probably no current in muscle unless electrodes are applied and an external circuit established through them, might also apply to any highly charged electric circuit.

Chapters IV to VII, inclusive, deal with the nervous system in a structural description, in which the emphasis seems more apt to fall on the non-essential than the essential, and which in places is so curtailed that it amounts to little more than a list of structures with only sufficient additional words to form sentences. Possibly no better criticism could be offered than quotation; on page 77, paragraph 3, we read: "On the ventral side of the medulla the olives (*olivae*), the pyramids (*pyramis*), and the decussation of the pyramids (*decussatio pyramidum*), are noticeable. On the dorsal side the cuneate tubercles, the clava, the *funiculus gracilis*, and the *funiculus cuneatus* appear. Conspicuous on the floor and side walls of the fourth ventricle (between the stem and the cerebellum) are the *striae acusticae* (or *striae medullares*) crossing the *area acustica*, the *eminentia teres* (*colliculus facialis*) and the beginning of the Sylvian aqueduct (*aqueductus cerebri*)." In contrast with this we read on page 79, paragraph 3: "Above the thalami are the two hemispheres of the cerebrum which are spread out over and behind the thalami and the mid brain. The hemispheres may be considered as ganglia, or groups of ganglia, the cells of which are in the outwardly lying portions (the cortex)." Except for passing mention in an occasional paragraph this is all the description of the cerebrum in the whole book. There is no mention of gyri or sulci nor description of the cortex.

The treatment of the spinal cord is exclusively descriptive, the columns are listed as ascending and descending, but no review of probable function is included and the statements concerning the origin of the different fibre groups are insufficient. For instance—"the fibres in the pyramidal tract are axons of cell bodies in the cerebral cortex. The cell bodies of the fibres in the other descending columns lie in the medulla, pons, cerebellum or midbrain or gray columns of the cord."

Under the visceral division of the nervous system, page 91, paragraph 3, the plexuses of Auerbach and Meissner are mentioned as forming "an independent local system with afferent and efferent fibres having (probably) no communication with the general nerve system" while in the next chapter, page 101, paragraph 1, "these plexuses contain numerous ganglion cells and are possibly connected with fibres from the other parts of the autonomic system." The discrepancy here is striking but even more so is the obvious failure to appreciate the functional significance of this system on control of involuntary muscular contraction (*vide supra*). No mention is made of the structural characteristics of these intrinsic nervous plexuses nor of the interesting phylogenetic correlation with that of *Medusa*.

Chapter VIII deals with the glands of the body and the material is handled much as in previous chapters. For instance the inclusion of the coccyeal and carotid bodies which with the adrenal medulla form part of the chromafine system among the principal members

of the endocrine glands and the exclusion of the testes and ovaries (except for mention in a foot note) certainly do not conform with the accepted opinion concerning the relative importance of these structures.

The final chapter which deals with the functional interrelation of receptors, neurons and effectors is chiefly remarkable for what it omits.

The paragraphs on cerebral localization take an attitude so adverse to the great mass of evidence from anatomical, pathological and experimental studies as to be inconceivable did we not bear in mind that we are dealing with a book in which there appears a brain without convolutions in a body without blood vessels.

Dunlap is to be congratulated on his intentions as expressed in his preface but the subordination of the functional to the structural, the unhappy choice of material for emphasis, the dogmatic form, and the errors and omissions, would seem to warrant the opinion that the book has failed to accomplish its task and serve to question gravely its value.

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